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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/531,847	04/18/2005	Matthias Mrzyglod	2002P01123WOUS	4073

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EXAMINER

STIMPert, PHILIP EARL

ART UNIT	PAPER NUMBER
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3746

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10/18/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/531,847

Applicant(s)

MRZYGLOD, MATTHIAS

Examiner

Philip Stimpert

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 April 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 11-25 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 11-25 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 18 April 2005 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- 1) ☒ Certified copies of the priority documents have been received.
 - 2) ☐ Certified copies of the priority documents have been received in Application No. _____.
 - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>4/18/2005</u> . | 6) <input checked="" type="checkbox"/> Other: <u>Copy of EP 509660</u> . |

DETAILED ACTION

Drawings

1. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description: 9, indicating a cylinder (for instance pg. 4, ln. 27). Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Objections

2. Claims 17 and 23 are objected to because of the following informalities: line 3 of each claim recites "an cylinder outlet pipe," instead of "a cylinder outlet pipe."

Appropriate correction is required.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

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4. Claims 11-25 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

5. Claim 11 recites the limitation "the medium to be compressed" in lines 15-16 of the claim. There is insufficient antecedent basis for this limitation in the claim.

6. Regarding claim 21, lines 15 and 21 of the claim both recite "a sound-dampening chamber." This causes confusion as to the nature of chamber or chambers, rendering the claim indefinite.

For the purposes of this office action, these recitations will be construed as "first sound-dampening chamber" and "a second sound-dampening chamber" respectively.

7. Regarding claim 22, line 2 of the claim recites "said sound-dampening chamber," which does not specify which of the sound-dampening chambers enumerated in claim 21 is being referenced. This renders the claim indefinite.

For the purposes of this office action, the limitation of "said sound-dampening chamber," will be construed as "said first sound-dampening chamber," namely the chamber recited as part of the inlet passage.

Claim Rejections - 35 USC § 102

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

9. Claims 11, 14-16, and 19-20 are rejected under 35 U.S.C. 102(b) as being anticipated by Hur et al. (US 6,398,523).

10. Regarding claim 11, Hur et al. teach a linear compressor unit (generally indicated by reference character 'C' in Fig. 12) comprising an electromagnetic alternating field (generated by stator assembly 31) surrounding at least a portion of a cylinder (20), a magnet (32) located in the electromagnetic alternating field in the cylinder, the magnet displaceable back and forth in the electromagnetic alternating field, a piston (40) located in the electromagnetic alternating field and in the cylinder (20) and drivingly connected to the magnet (32). Hur et al. further teach a buffer volume (space containing spring 51b) and a module casing (450) enclosing the cylinder and buffer volume such that the cylinder is mounted in the module casing (450) so that the cylinder can oscillate in the module casing (either in elastic reaction to operation of the piston (40) or in concert with an oscillatory motion of the entire assembly), the module casing including an inlet passage (at the right side) for the medium to be compressed, and the cylinder (20) including an inlet opening (the part of element 402 to the right of the lead line in Fig. 13) lying opposite the inlet passage without making contact therewith. Hur et al. also teach a passage to the buffer volume (between 410 and 400 at their closest points to each other) and that the passage constitutes a sound restrictor element (col. 9, ln. 61-63) which is therefore located in the buffer volume passage.

11. Regarding claim 14, Hur et al. teach that the cylinder includes a chamber (bordered by the piston 40, the cylinder 20, and the discharge valve assembly 61) for receiving the piston and a sound-dampening chamber (402) through which the medium

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to be compressed flows, the sound-dampening chamber (402) being arranged between the inlet opening of the chamber and the piston chamber.

12. Regarding claim 15, Hur et al. teach a sound-dampening chamber (410) through which the medium to be compressed flows located in the inlet passage of the module casing (450).

13. Regarding claim 16, Hur et al. teach that the sound-dampening chamber (410) is formed in a flat-cylindrical shape (as shown in Figs. 12-13) with a cylindrical axis opening and the inlet passage of the module casing (450) is aligned therewith.

14. Regarding claim 19, Hur et al. teach that the magnet (32) is formed as an axial extension of the piston (40), in that the magnet is shown extending axially from a portion of the piston.

15. Regarding claim 20, Hur et al. teach that the magnet (32) is formed as a ring shaped body (as shown in Figs. 12-13).

Claim Rejections - 35 USC § 103

16. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

17. Claims 11-16, 19-22, and 24-25 rejected under 35 U.S.C. 103(a) as being unpatentable over Terauchi (EP 0509660) in view of Hur et al.

18. Regarding claim 11, Terauchi teaches a linear compressor unit comprising an electromagnetic alternating field (generated by magnetic field coil 10) surrounding at

least a portion of a cylinder (15), a magnet (11a, 11b, or 11c) located in the electromagnetic alternating field in the cylinder (15), the magnet displaceable back and forth in the electromagnetic alternating field, a piston (12-14) located in the electromagnetic alternating field in the cylinder (15) drivingly connected to the magnet. Terauchi further teaches a buffer volume (27), a module casing (1) enclosing the cylinder (15) and the buffer volume (27), and that the cylinder (15) is mounted in the module casing (1) so that the cylinder (15) can oscillate in the module casing (col. 2, ln. 6-8, absorption implies that some amount of reciprocation does occur). Terauchi further teaches the module casing including an inlet passage (2) for the medium to be compressed, as well as that the cylinder includes an inlet opening (28) lying opposite the inlet passage (2) without making contact with it. Terauchi teaches neither a passage (28) to the buffer volume (27) formed between the inlet opening (181) and the inlet passage (2), nor a sound restrictor element located in the buffer volume passage. Hur et al. teach a sound restrictor element (400) for use in the intake flow path of a linear compressor, in particular between relatively reciprocating elements. Hur et al. state that their suction induction member 400 is useful "for... guiding the suction of the refrigerant gas and secondly decreasing noise during the suction of the refrigerant gas," (col. 9, ln. 61-63). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to combine a suction induction member as taught by Hur et al. with the compressor of Terauchi in order to decrease the noise of suction during operation of the compressor. This suction induction member, formed in attachment or as a part of the inlet opening (28) and generally proceeding between inlet opening (28)

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and an inlet passage (2, the position of which would be changed to accommodate the combination) would comprise a passage to the buffer volume, and would constitute a sound restrictor element located in that buffer volume passage.

19. Regarding claim 12, Hur et al. teach the limitation that the sound restrictor has a pair of intermeshing walls (Hur et al., 402 and 410), a first set of walls (410) attached to a casing (450) and the second set of walls attached to the piston (40), wherein the piston (40) reciprocates relative to the casing (450). It would therefore be obvious in the combination to provide the intermeshing walls of the suction induction member in such a fashion that the first set of walls were attached to the module casing (1) of Terauchi and the second set of walls were attached to the cylinder, since the cylinder reciprocates relative to the module casing (1).

20. Regarding claim 13, Hur et al. teach that their intermeshing walls are ring shaped and surround the inlet passage.

21. Regarding claim 14, Terauchi teaches that the cylinder (15) includes a chamber (22) for receiving the piston (12-14) and a further chamber (25) through which the medium to be compressed flows, arranged between the inlet opening (28) and the piston chamber (22). Terauchi does not explicitly disclose that this chamber has sound-dampening functionality, but given the teachings of sound-dampening chambers present in the suction induction member (400) of Hur et al. and the knowledge of one of ordinary skill in the art, it would have been obvious to form the chamber (25) such that it would constitute a sound-dampening chamber.

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22. Regarding claim 15, Hur et al. teach that their suction induction member includes a sound-dampening chamber (412) which, according to the combination, constitutes part of the inlet passage of the module casing.

23. Regarding claim 16, Hur et al. teach that the sound-dampening chamber (412) is formed in a flat-cylindrical shape with a cylindrical axis opening and the inlet passage of the module casing is substantially aligned therewith.

24. Regarding claim 19, Terauchi teaches that the magnet (11a, 11b, or 11c) is formed as an axial extension of a portion (12) of the piston.

25. Regarding claim 20, Terauchi teaches that the magnet (11a, 11b, or 11c) is formed as a ring shaped body at least partially surrounding the piston (12-14) and connected thereto at an end (12) of the piston.

26. Regarding claim 21, Terauchi teaches a linear compressor unit comprising an electromagnetic alternating field (generated by magnetic field coil 10) surrounding at least a portion of a cylinder (15), a magnet (11a, 11b, or 11c) located in the electromagnetic alternating field in the cylinder (15), the magnet displaceable back and forth in the electromagnetic alternating field, a piston (12-14) located in the electromagnetic alternating field in the cylinder (15) drivingly connected to the magnet. Terauchi further teaches a buffer volume (27), a module casing (1) enclosing the cylinder (15) and the buffer volume (27), and that the cylinder (15) is mounted in the module casing (1) so that the cylinder (15) can oscillate in the module casing (col. 2, ln. 6-8, absorption implies that some amount of reciprocation does occur). Terauchi further teaches the module casing including an inlet passage (2) for the medium to be

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compressed, as well as that the cylinder includes an inlet opening (28) lying opposite the inlet passage (2) without making contact with it. Terauchi also teaches that the cylinder includes an inlet opening (28) lying opposite the inlet passage without making contact therewith, the cylinder including a chamber (22) for receiving the piston (12-14) and a second sound-dampening chamber (25, as discussed in above rejection of claim 14) through which the medium to be compressed flows, the second sound-dampening chamber arranged between the inlet opening (28) and the piston chamber (22). The combined references teach a passage to the buffer volume formed between the inlet opening (28) and the inlet passage, as well as a sound restrictor element located in the buffer volume passage consisting of a pair of intermeshing walls, a first set of walls attached to the module casing (1), a second set of walls attached to the cylinder (15), the intermeshing walls being formed in a ring shape and surrounding the inlet passage. The combined references also teach the limitation of a first sound-dampening chamber (Hur et al. 410) in the inlet passage through which the medium to be compressed flows.

27. Regarding claim 22, Hur et al. teach that the first sound-dampening chamber (410) is formed in a flat-cylindrical shape with a cylindrical axis opening and the inlet passage of the module casing is substantially aligned therewith according to the combination.

28. Regarding claim 24, Terauchi teaches that the magnet (11a, 11b, or 11c) is formed as an axial extension of a portion (12) of the piston.

29. Regarding claim 25, Terauchi teaches that the magnet (11a, 11b, or 11c) is formed as a ring shaped body at least partially surrounding the piston (12-14) and connected thereto at an end (12) of the piston.

30. Claims 17-18 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Terauchi in view of Hur et al. as applied to claim 11 above, and further in view of Kawahara et al. (US 6,273,688) and Bohlmann et al. (US 6,273,688).

31. Regarding claims 17-18 and 23, the previously combined references do not teach the limitation of the cylinder being mounted for oscillation in the module casing by a cylinder outlet pipe, nor that the cylinder outlet pipe is helically formed around the cylinder. Bohlmann et al. teach a muffler assembly which in particular includes a helical exhaust pipe, stating that "low inherent frequencies are obtained... by increasing the pipe length" and teach, in Fig. 5, a structure for accomplishing that increase in pipe length, namely to form the exhaust pipe helically. Kawahara et al. teach the use of a helically formed cylinder outlet pipe in a linear compressor. In particular, Kawahara et al. teach that "by winding the discharge tube into a spring shape and by increasing the spring constant of the supporting mechanism greater than that of the discharge tube, it is possible to enhance the resistance to vibration, and to shorten the overall length of the compressor, thereby reducing the compressor in size," (col. 6, ln. 53-58).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to provide the compressor of the previously combined references with a cylinder outlet pipe formed helically around the cylinder and mounting the cylinder for oscillation in the module casing, in order to simultaneously increase the resistance to

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vibration and muffle low inherent frequencies, while still maintaining a short overall length of the compressor.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Philip Stimpert whose telephone number is (571) 270-1890. The examiner can normally be reached on Mon-Fri 8:00AM-5:00PM, Alt. Fridays, EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Devon Kramer can be reached on (571) 272-7118. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

PES
10 Oct 07

DEVON C. KRAMER
PATENT EXAMINER

Devon Kramer
10/15/07